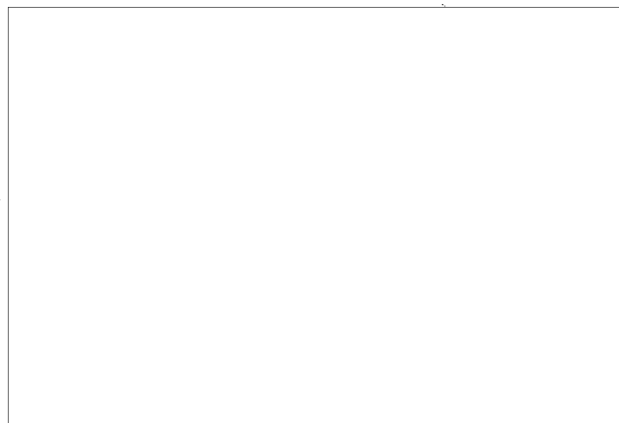
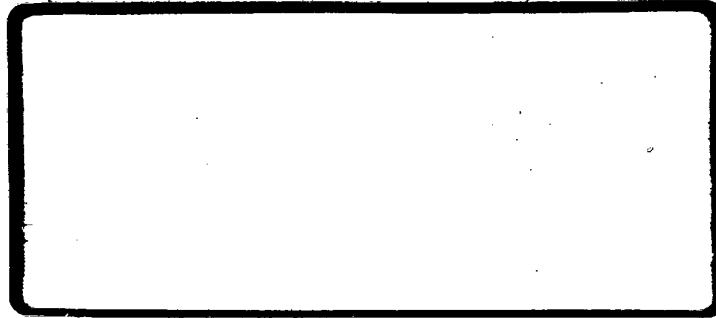


11038



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STATUS REPORT

for Period

1 April through 30 April 1969

Submitted under Contract to

U. S. Government

File No. 11038

STAT

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**Page Denied**

This document is presented as the Monthly  
Status Report under Contract to the U. S.  
Government,

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The report period represented herein covers  
the period 1 April through 30 April 1969.

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## APPENDICES

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## PROGRAM SUMMARY

Scheduled Percentage of Completion - 57.1%

Actual Percentage this Date - 54.6%

Overall program progress has kept pace with the projected program plan in most of the key activities.

The optical system procurement is on the critical path and there are indications that there may be difficulty in maintaining the future schedule. See Task 16 and Appendix I.

The various subsystem checkout and tests are proceeding as scheduled with a minimum amount of rework.

The facilities installation has been completed, except for some minor insulation requirements, and the electronic cabinets are being set in place in the clean room.

The progress being made by the subcontractors is discussed under separate task headings.

In general, program progress is being accomplished according to plan.



Task 01      Statements of Work, Specifications, Report  
Preparation

Scheduled percentage of completion                      60%

Actual percentage this date                                      60%

No new specifications were developed or issued during this report period. The regular monthly reports were received from our subcontractors as required.

These reports are incorporated into this document under appropriate task headings.

Task 02            Scheduling and Planning

Scheduled percentage of completion            60%

Actual percentage this date            60%

There has been no requirement for any changes to the schedule as presented in the March report.

Detailed schedules for the assembly and test prior to receipt of the Optical Bridge from  are being developed and will be implemented as necessary to maintain the schedule.

STAT

Task 03            Test and Inspection Procedures

Scheduled percentage of completion            38%

Actual percentage this date                      38%

There has been significant progress made in the development of the philosophy for the test procedures. We anticipate an accelerated effort in this area in the next three report periods as the result of obtaining the many test targets and the directions given to the several subcontractors.

**Task 04      Management, Administration and Supervision**

Scheduled percentage of completion      60%

Actual percentage this date      60%

Management and Administrative functions are  
proceeding normally with no departures from the original  
Management plan.

Task 05, Meetings

Scheduled percentage of completion 60%

Actual percentage of completion 60%

During the month of April, a review meeting was held with the customer at the  facilities. The agenda follows:

STAT

1. Description of the Stereocomparator.
2. Demonstration of Stereocomparator air bearings and stages.
3. Discussion of the Clean Room, and tour of the facilities.
4. Examination of electronic equipment.
5. Review of job schedule.
6. Discussion of Spare Parts List and Maintenance Program.
7. Review of servo simulation program.

Additionally, a meeting was held with the customer and the customer's site preparation consultant. This meeting is discussed in detail under Task 38 with additional information under Task 30.

Task 06 Facilities Requirements

Scheduled percentage of completion 98%

Actual percentage this date 80%

There has been a considerable amount of progress in the activation of  clean room during this report period:

STAT

- 1) The inside duct work is completed and the dampers installed in these ducts.
- 2) The filter banks have been mounted and the pressure gages installed.
- 3) Outside insulation has been 90% completed and the condenser has been charged.
- 4) The control system is completed.
- 5) Simulated computer floor has been installed.

We plan to balance the system during the first two weeks of May and to start the system toward the end of the next report period.

Task 07            Main Frame and Structural Elements

Scheduled percentage of completion            98%

Actual percentage this date                    93%

The main frame for the Stereocomparator was completed in September 1968.

No additional work will be scheduled for this task until the return of the optical bridge by the optics sub-contractor.

Task 08

Skin

Scheduled percentage of completion 35%

Actual percentage this date 30%

Fabrication of the remaining skin sections is  
scheduled for the month of May.

No work was scheduled on this task for the  
month of April.



Task 09

Granite and Ways Assembly for Stage

Scheduled percentage of completion 98%

Actual percentage this date 95%

As reported last month, the remainder of the granite was received from the vendor.

No work was scheduled on this task for the month of April.

Task 10      Air Bearings

Scheduled percentage of completion      72%

Actual percentage this date      75%

The air bearings required to guide and support the right and left hand stages were installed in February.

No work was scheduled on this task for the month of April.

Task 11      Stage Drives

Scheduled percentage of completion      62%

Actual percentage this date      55%

Installation of the stage drive assemblies on to  
the right and left hand stages is scheduled for the month of May.

No work was done on this task during the month  
of April.

Task 12

Film Drive and Transport System

Scheduled percentage of completion 58%

Actual completion this date 65%

The modifications to the film drive and transport system have been completed by the  shop.

STAT

It is anticipated that re-assembly and testing of this system will be accomplished during the month of May.

Task 13. Film Platen and Film Clamping

Scheduled percentage of completion 55%

Actual percentage this date 55%

To insure proper operation of the film platen and film clamping assembly, an air jet was installed at the curled edge of the film, preceeding the vacuum clamping. This method tested satisfactorily, and we have incorporated this device into the design.

No further work is proposed on the vacuum clamping system until installation of this assembly on to the Stereocomparator.

Task 14      Film Cooling

Scheduled percentage of completion      46%

Actual percentage this date      45%

The installation of the new valving required for  
the film cooling system is being installed by the  shop.

STAT

It is anticipated that this installation will be  
completed during the month of May.

Tasks 16, 17  
and 18

Viewing Optics, Viewing Illumination, Reticle  
Projector and Illumination

Scheduled percentage of completion 71%

Actual percentage this date 70%

During the month of April, [ ] continued to send drawings detailing the wiring installations required to interface the optical subassemblies in the optical bridge to the optics sub-contractor.

STAT

Additionally, an air shipment of optical bridge cables and associated electrical components for installation in the optics system was made to [ ] in April.

STAT

A monitoring trip to [ ] was made during this report period. A copy of the trip report is included as Appendix I of this report.

STAT

Task 20

General Platen Illumination

Scheduled percentage of completion 61%

Actual percentage this date 45%

No additional work was scheduled for this task  
for the month of April.



Task 21            Optical Bridge and Supports

Scheduled percentage of completion            90%

Actual percentage this date                    90%

During the month of April,  continued to send  
to the optics subcontractor drawings detailing the wiring installa-  
tions and connectors for their use in interfacing the optical bridge  
with the optics system.

STAT

Task 22 Interferometer Assembly

Scheduled percentage of completion 61%

Actual percentage this date 57%

The interferometer assembly will be installed on the Stereocomparator after the stage drives have been installed. It is anticipated that this work will begin during the month of May.

No work was scheduled on this task for the month of April.

Task 23 : Optics Drive Assembly

Scheduled percentage of completion 57%

Actual percentage this date 55%

The final chassis checkout for the optics drive assembly is nearly complete. During the checkout, we discovered that some minor modifications in the circuitry with respect to the film brightness control servo drives appeared necessary.

These modifications are presently being implemented in the system.

The checkout of the assembly is proceeding on schedule, and we anticipate system testing will begin during the month of May.

Task 24      Image Analysis System

Scheduled percentage of completion      65%

Actual percentage this date      70%

Progress on this task is detailed in

STAT

Progress Report for the period ending March 31, 1969 which  
is included as Appendix II.

Task 26      Digitizing Logic Subassembly

Scheduled percentage of completion      95%

Actual percentage this date      86%

Since we are now in the process of checking out the digitizing logic subassembly, metric readout and output logic, interfaces and systems as a complete system, we will incorporate discussions of Tasks 26, 27 and 28 under Task 28 - Output Logic and Interfaces and Systems.

Please refer to Task 28 of this report.

Task 27

Metric Readout

Scheduled percentage of completion 98%

Actual percentage this date 95%

Since we are now in the process of checking out the digitizing logic subassembly, metric readout and output logic, interfaces and systems as a complete system, we will incorporate discussions of Tasks 26, 27, and 28 under Task 28 - Output Logic and Interfaces and Systems.

Please refer to Task 28 of this report.

Task 28                      Output Logic and Interfaces

Scheduled percentage of completion                      98%

Actual percentage this date                                      75%

☐ has interconnected the various chassis located in the logic rack, and we are now testing the electronics as a subsystem.

STAT

In particular, we have connected the console and the display panel with the metric readout chassis, the stage position chassis, the output interface, the digitizing logic, and the punch control.

We are reading and punching information on the IBM punch using the coordinate readout buffers for all four axes. Both the right and left stage buffer units are working properly, and data is punched out correctly.

The seven record controls, the 4 x 4 matrix, and the 10 x 10 readout characters are also read out correctly through the output interface.

It is anticipated that the interconnection between the internal computer interface with the Honeywell computer will be accomplished within the next few days.

## Task 29           Cabling

Scheduled percentage of completion           98%

Actual percentage this date                   92%

The cable assemblies to be used to interface the optical system with the optical bridge were sent to the optics sub-contractor during the month of April.

The percent progress of the cabling required to inter-connect the various electrical and electronic elements being assembled in the  shop is as follows:

STAT

Cabinet #1 (Stage drives, film drive and transport system)	100%
Cabinet #2 (Optics drive, interface with Image Analysis System)	100%
Cabinet #3 (Metric readout, output logic and interfaces)	92%
Electrical arrangement (floor interconnection of all cables)	91%
Control Console	97%
Display Panel	99%
Optical Bridge	99%
Stage Assembly	73%



Task 30 Control Console and Chair

Scheduled percentage of completion 84%

Actual percentage of completion 75%

During the month of April, the [ ] shop fabricated the necessary parts for the headrest on the control console. These will be assembled and installed on the console during the next month.

STAT

[ ] has been exploring various tracks and rollers for the sub-floor mounting of the operator's chair. Fabrication of the required parts is scheduled to coincide with the actual installation of the console and chair. The customer's site preparation consultant has requested the installation details of the tracks to be installed in the computer floor for the chair and the control console.

STAT

The entire display panel portion of the electronics console has been tested and is operational. The pushbutton keys associated with data readout into the external computer system and the IBM card punch have been tested and are functioning properly.

Work is beginning on the checkout of the pushbutton controls associated with the machine's internal computer and logic circuitry.

Task 32            Computer

Scheduled percentage of completion            98%

Actual percentage this date                    95%

The computer has been disassembled, cleaned and installed in the electronic rack. The system has been checked out for operation, and all of the computer equipment appears to be operating satisfactorily.

Installation of the high-speed punch and readout interface is scheduled to begin during the next month.

Task 33            Electronic Racks and Control Cabinets

Scheduled percentage of completion            90%

Percentage completed this date            90%

The  shop is now in the process of installing  
the electronic racks and control cabinets in the Clean Room  
facility.

STAT

It is anticipated that by the end of May, all the  
electronic racks and associated equipment will be installed and  
operating in the Clean Room.

Adjustment of the air flow through the various  
electronic cabinets to obtain proper rack and chassis cooling will  
be performed during May in connection with the start up of the  
Clean Room air conditioning plant.

Task 34 Utilities, Vacuum and Air Systems

Scheduled percentage of completion 60%

Actual percentage this date 58%

The installation of the utilities into the cabinet is progressing in the  shop. Because of the new valving required for the film cooling system (Task 14), the work has been delayed; however, it is anticipated the installation will be completed during the next month.

STAT

Task 35      Vibration Absorption and Leveling

Scheduled percentage of completion      90%

Actual percentage this date      85%

No work was scheduled for this task during the month of April.

Additional testing of the vibration absorption and leveling system is scheduled by  for the month of May. This testing will be done to determine response time with stage movement and corresponding deflection.

STAT.

Task 36 Overall Assembly

Scheduled percentage of completion 40%

Actual percentage this date 22%

During the month of April, the computer was installed and interface between the computer, card punch and display console is in progress (see Task 28).

Installation of the electronic racks in the Clean Room facility was also begun in April.

Additional installation of the completed sub-assemblies is scheduled for the next month.

Task 37            Radio Frequency Noise Suppression

Scheduled percentage of completion      0%

Actual percentage                              0%

No work was scheduled on this task for the  
month of April.

Task 38                      Environmental Control

Scheduled per centage of completion                      75%

Actual percentage this date                                      75%

During the month of April, a meeting was held at  STAT  
facilities with the customer and the customer's site preparation consultant  
to discuss quantities of machine cooling air and the air required for film  
transport and film cooling.

The customer consultant's chart, Air Quantity and Temper-  
ature Rise, was discussed, along with  drawing E8582, Customer STAT  
Interface - Machine Cooling Air.

The quantity of the Stereocomparator cooling air was increased,  
and the number of customer-furnished outlets for designations CVR 6, 8 and  
11 on the consultant's chart was doubled. All outlets are to be two inches  
in diameter, and will be bushed down by  to the proper diameter at STAT  
the equipment interface.

The customer-furnished air control for the film lift-off,  
stand-off, and film cooling was discussed. It was decided that instead  
of two basic controllers, the customer would furnish four basic controllers -  
two controllers for the film lift-off and for the stand-off air, and two con-  
trollers for the film cooling air. One set of controllers will be installed  
for each side of the Stereocomparator. This was necessary because of the  
different pressure ranges experienced in the  tests for film cooling, STAT  
lift-off and stand-off.



Task 39      Reliability Analysis

Scheduled percentage of completion      0%

Actual percentage this date      0%

No work was scheduled on this task for the  
month of April.

Task 40                      Installation

Scheduled percentage of completion                      0%

Actual percentage this date                                      10%

During the month of April, a meeting was held  
at  facilities with the customer's site preparation consultant  
and the customer to discuss installation requirements at the site  
for the Stereocomparator.

STAT

See Task 38 for detailed discussion of this  
meeting.

Task 42 Breadboards and Test Devices :

Scheduled percentage of completion 45%

Actual percentage this date 28%

The wiring of the breadboard test fixture for the computer controlled optics drives is nearly complete, and preliminary phasing and limit switch adjustment work will be carried out during the month of May.

This work will be done in conjunction with the test program being conducted on the optics drives electronic chassis.

Task 43      Computer Programming and Services

Scheduled percentage of completion      80%

Actual percentage this date      65%

During the month of April, a meeting was held with representatives from [ ] at the [ ] facilities. A copy of the minutes of this meeting is included as Appendix III.

STAT

[ ] Progress Report for the period from March 1 to March 31, 1969 is included as Appendix IV.

STAT

Task 44

Preacceptance Test in Fabrication Plant

Scheduled percentage of completion 0%

Actual percentage this date 0%

No work was scheduled for this task for the  
month of April.

Task 45                      Acceptance Test in Fabrication Plant

Scheduled percentage of completion                      0%

Actual percentage this date                                      0%

No work was scheduled for this task for the  
month of April.

Task 46

Acceptance Test after Installation

Scheduled percentage of completion 0%

Actual percentage this date 0%

No work was scheduled on this task for the  
month of April.

Task 47                      Instruction Manual and Drawing Submittal

Scheduled percentage of completion                      26%

Actual percentage this date                                      15%

                    The revision of the design drawings to cover the  
"as built" status of the various subassemblies of the Stereocomparator  
is proceeding according to schedule.



Task 48      Spare Parts List

Scheduled percentage of completion      10%

Actual percentage this date      25%

Work is continuing on the compilation of the recommended spares for the Stereocomparator, both mechanical and electronic components.

Task 49            Operator Training

Scheduled percentage of completion            10%

Actual percentage this date                      53%

Work is continuing on the Operator Training  
Manual which will be used in training personnel to operate  
the Stereocomparator.

APP. I

## TRIP REPORT

Company Contacted:

STAT

Contacted by:

Contact dates:

April 14 through 18, 1969

Job No.:

342 - Tasks 16, 17, 18

Persons Contacted:

STAT

Text Fixture and Assembly Room

STAT

has completed the <sup>S</sup>text fixture for holding the optical elements during alignment checkout and acceptance testing. The device has the general configuration of the Stereocomparator but is made of reinforced concrete and rests on a new concrete foundation set some four feet into the earth below the concrete floor of a basement room where the installation has been made.

STAT

The fixture is well made and has steel plates set into it which will provide the surfaces for levelling and bolting down the various elements of the optical bridge and the illumination system.

The concept of using reinforced concrete as a building material of the fixture seemed, at first, rather unusual; however the installation looks very satisfactory, and there is no apparent reason why it will not perform its function adequately.

[ ] was asked to provide a platform at an elevation suitable to allow proper access to the various elements of the optical system and electronics. Two small desks and a work table for the electronic testing equipment are to be located on the platform. The platform will be arranged all around the Stereocomparator.

STAT

[ ] will provide compressed air for cooling the test targets and other portions of the optical and electrical system. This will be at approximately 35 psig, and 50 cubic feet per minute under standard conditions. In addition to the high pressure air, there will be clean air for the general ventilation of the optical bridge. This air will be at 15 inches of water pressure, and there is to be about 1500 cubic feet per minute available under standard conditions.

STAT

A suggestion was made that [ ] might wish to air condition the room. However, since the acceptance tests will not be performed until the winter, this does not seem an essential requirement. Air conditioning during the summer months would be a convenience, but presumably during the acceptance testing period the temperature could be kept relatively uniform by simple electrical heating of the test fixture area.

STAT

The room was not clean, and since [ ] does not plan to have a clean room type of ventilation, there may be a problem of dirt pick-up by the optical system. [ ] does not consider this situation resolved at this time.

STAT

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To help combat the general dirt problem, [ ] was asked to paint the floor and the test fixture, and provide a double entrance door so that at least the room could be slightly pressurized. The work areas directly outside the test fixture room are extremely dirty, and every effort will have to be made to keep this dirt from getting into the test fixture area.

STAT

In addition some of the testing will be done at reduced ambient light levels and [ ] was requested to provide dark shades for the windows.

STAT

#### Objective Assembly - Film Cooling

During the past two months, [ ] has made a breadboard of the objective assembly with special reference to the film cooling air jet area. This breadboard of the air jet system has been found to be quite unsatisfactory in that the air passages do not distribute the air evenly to the six jets which impinge the cooling air on the film.

STAT

[ ] was given the test unit made by [ ] and they are going to modify the subassembly so that there will be an equal flow of air out of the six jets. [ ] will probably isolate the six air channels and will provide six connections so that the [ ] air supply can be equalized by the use of a manifold. The six individual pipe lines can be throttled as necessary to equalize the air flow rate.

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In addition, [ ] had added to the objective lens fixture mockup an arrangement for providing downward acting air jets to keep the film from being scratched in its passage beneath the objective lens assembly. The device built at [ ] consisted of a ring of tubing

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surrounding the objective lenses. The tubing is provided with eight holes, approximately 1/32" in diameter, aimed vertically downward.

[ ] will presumably have to perform a few experiments with this air handling system to insure that the device they build will have the same characteristics as the breadboard unit given to them by [ ]

STAT

STAT

#### Air Cooling Supply for the Optical Bridge

[ ] is providing the air cooling supply for the optical bridge. It is necessary for them to be given the diameter of the duct to supply this air, and also the number and size of the various outlet nipples which [ ] requires for the attachment of the flexible air hoses. This information should be sent to [ ] as soon as possible.

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The flexible vinyl ducts (air hoses) supplied by [ ] for carrying cooling air to the various optical elements and the drive motors, etc., should be shipped to [ ] as soon as possible. In addition, the plastic cooling bags and the panduit type SS-T cable ties should also be sent. Where it is not possible to attach the air conduits to the various parts by simple compression clamps, adhesive tape will be used.

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#### Drawing Review

STAT

One of the most time consuming, but essential tasks which are performed during the monitoring visits by [ ] is the

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review of the latest [ ] drawings and a discussion of the many design and fabrication problems that have arisen since the last [ ] visit. The rapid resolution of these problems is essential, and this can only be done readily with a face-to-face discussion. Some typical problems that were discussed follow:

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1. Drawing C8555 (Center Bearing Layout - Optical Bridge)

This drawing shows a set of holes in the lower outside surface of the assembly. These holes were to mount the vacuum clamping device required by [ ] and contemplated to be built by [ ] In actuality, this device has been supplanted by an alternative design using air jets on the film platen. Therefore, [ ] was advised that these particular holes were not required.

STAT

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2. Drawing E7469 (Ensemble Gauche, Condenseur Cliche)

The bracket item 160 on the drawing will be mounted on item 149 on the drawing, and this will free the electric cabling from the part since, without this change in the bracket, the cable would become captive to the subassembly. There is an error and confusion with respect to the plugs on the end of the cable. The bolted flange receptacle should be mounted on the proper (captive) end of the (plug/receptacle) assembly.

3. Drawing E7540 (Montage Droit, Diaphragme a Ouvertures)

[ ] requires the appropriate two sets of plugs presumably with receptacles as marked on the drawings by [ ] has shown MS 3102 A 16 SP and this is concurred with by [ ]

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4. Drawings E4960B (Montage Zoom Afocal-Gauche G10 Branches  
d'Exploration)

and C8052D (Main Zoom Sch. Zoom afocal Gauche)

There is some confusion between the drawings made by [ ] and the drawings made by [ ] with regard to the attachment of the appropriate harness elements to the potentiometers. Specifically, Drawing E4960B does not compare with Drawing C8052D with respect to calling out the potentiometer cups. The [ ] drawings must be made compatible with [ ] as soon as possible and sent to [ ]. This is an urgent item as [ ] is planning this work in detail, and will be performing it in the next few weeks. The [ ] potentiometer cup designations can be found in the tabulations contained in the [ ] 01 Specification book, entitled, Systemes Asservis.

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[ ] was not clear as to which of the various cups on a given potentiometer was designated Cup 1. They were told that Cup 1 was the unit nearest the shaft end of the potentiometer in all cases.

STAT

5. Drawing E4680 (Courbes de Fonctionnement de l'ensemble - Zoom  
10X Exploration)

[ ] is concerned that [ ] has not properly provided the potentiometer for phase angle variation in connection with the 10X zoom condenser variable diaphragm. This should be reviewed by [ ] and [ ] informed as to the conclusion.

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6. Drawing E4960B (Montage Zoom afocal Gauche 6-10, Branches  
d'Exploration)

On the above drawing, there is a requirement that the various cups on the potentiometer be phased as shown by the [ ] 01 Specification.

STAT

The [ ] requirements should be reviewed, and the appropriate [ ] drawings made compatible with these requirements and the potentiometers ordered, if presently not on order. STAT  
STAT

The drawings and the potentiometers should be sent at the very earliest possible date to [ ] as they need these parts urgently. STAT

7. Drawing E7639B (Montage Gauche Vehicules, Eclairage du Film)  
Main Illumination

The sense of rotation of the light filter wheels was reviewed. For the left side of the system, the potentiometer is turned clockwise as the light level is decreased by the filter wheels. The clockwise designation for the potentiometer is determined by looking at the outboard end of the shaft, with the potentiometer body away from the observer and from the shaft.

8. Drawing E7604B (Montage Droit Vehicules, Eclairage du Film)  
Main Illumination

For the right side of the optical system, the potentiometer has the same sense, i.e., it turns clockwise as the light level is decreased.

9. Drawing E5387B (Montage des Disques Adjustment de l'eclairage)  
Light Level Change at the Eyepiece

The motor for adjusting the light level turns clockwise as the light level is decreased. The motor designation is with the outboard end of the shaft seen by the observer with the remainder of the shaft and motor away from the observer.

10. Drawings E7220C and E7221C (Montage Gauche and Droit Eclairage  
Projecteurs de Spot)

The potentiometer turns clockwise as the light level is decreased.

11. Drawing E7220C (Montage Gauche and Droit Eclairage Projecteurs  
de Spot)

and Drawing C8048A (Reticle Brightness Schematic)

Drawing C8048A shows a total of 8 microswitches. Drawing E7220C shows only four microswitches, and these are on the color filter with none on the variable density filter wheel. [ ] was told that they must provide the microswitches on all elements where continued rotation of the drive motor could cause damage to the optical elements or the optical drive.

STAT

This requirement had been stated to [ ] in two cables during July 1968, but somehow had been overlooked by them.

STAT

In most cases, three microswitches are required on all systems at each of the driven limits of the system, i.e., there is a microswitch arranged so that the acceleration of the driving motor may be dropped to a safe level as the terminal position of the optical element is approached. A second microswitch is provided to send a stop signal back to the motor drive system when the actual optical terminal drive point has been reached. There is a third microswitch located beyond microswitch #2 to open the driven motor circuit in the event of either electronic equipment failure or microswitch #2 failure. The difference in the setting between microswitch #1 and #2 is approximately 10% of the full travel of the drive. The difference between microswitch #2 and #3 is approximately 2% of the full travel of the drive.

12. Drawings E4830 (Montage Gauche des Commander de Permutation)  
E6971  
E5120 (Montage de l'anamorphosem Droit (Rapport 2))  
E7040 (Montage Zoom Afocal Gauche G-10)  
E7150 (Montage Zoom Afocal Gauche G-4)

The above drawings must include 3 microswitches for each drive terminal position. The microswitch arrangement must be designated as mentioned for drawings E7220C and C8048A. The drawing numbers given above are representative only of the requirements, and do not show both left and right sides of the optical system, nor does the list necessarily include all items requiring the three microswitches.

13. Drawing C8048 (Reticle Brightness Schem. - Eclairage)

This drawing shows two motors. How many microswitches are required?  asks if one of the motors might be a tachometer shown in error as a motor.  should review this situation and answer  immediately.

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14. Drawing C8058 (Object Changeover Schem. - Ensemble Gauche)

There are only two microswitches shown on this drawing.

should review and appropriately inform

SSTAT

15. Drawing E4830 (Montage Gauche des Commander de Permutation  
 et de Mise)

There are three microswitches required on the above assembly.

This relates to each terminal point of the drive. In addition, there is one microswitch to provide information for the computer.  questions whether the  cable and plug drawings are compatible with drawings E4830 and C8058.

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16. Drawings C8048 (Reticle Brightness Schem. Eclairage)  
and C8584 (Illum. Contr. Schem. Vehicules)

Comparing the above two drawings, there are no limit switches shown on C8584, while on C8048, there are two sets of limit switches. [ ] has a telegram dated 4/14/69 from [ ] which says there are no limit switches required on the reticle or main filter wheels. There are no limit switches shown on the [ ] drawings affected. [ ] feels there is a conflict of direction and confusion between the drawings on this particular item. Elsewhere [ ] has been required to use three microswitches for filter wheels. They should be advised immediately as to the correct design requirement.

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17. Drawing C8052 (Main Zoom Schematic - Zoom Afocal Gauche)  
and Drawing E4960 (Montage Zoom Afocal - Gauche G-10)

There are three sets of microswitches shown correctly; however, there is a confusion between the potentiometer cup identification by [ ] as compared to that shown on the [ ] drawings. In addition, [ ] questions whether or not [ ] has properly responded to the potentiometer phase angle requirement. These two problems were described earlier in the present list.

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18. Drawings C8053-1 (Anamorph Ratio Schem. Anamorphoseur - Gauche)  
and E5121 (Montage de l'anamorphoseur - Droit (Rapport2))

Comparing the above two drawings, [ ] was told that three sets of microswitches were required.

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19. Drawing C8051 (Anamorph Rot. Schem. Anamorphoseur - Gauche)

[ ] requires identification of the 4 potentiometer cups so they may connect the harness wiring properly.

STAT

20. Drawing C8583 (Afocal Changeover Schem. - Eclairage du Film)

This drawing requires diodes to be installed in the harness assembly by [ ] These diodes should be purchased by [ ] and sent as soon as possible to [ ]

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STAT

21. Drawing E7750 (Montage du Systeme Afocal - Gauche Pour Objectif F-80)

This drawing shows only two microswitches. If over-travel occurred, the existing microswitch bracket would be smashed by the drive mechanism. [ ] asks if we require three microswitches for this system.

STAT

22. Drawing E7639 (Montage Gauche Vehicules Eclairage du Film)  
Drawing C8584 (Illum. Contr. Schem. Vehicules - Eclairage du Film)

On the main filter wheel, there are no microswitches shown by [ ] On the color filter switch-over, there are two microswitches shown at each termination point of the drive motion. On the fixed diaphragm field lens, there are two microswitches shown at each end of the drive motion. [ ] asks how many microswitches are required on the individual systems shown above.

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23. Drawing C8585 (Diaphragm Contr. Schem. Eclairage du Film)  
Drawing E7539 (Montage Gauche Vehicules - Eclairage du Film)

There are ten turn potentiometers in the assembly, and [ ] asks if a third microswitch is required by [ ] There is a confusion in drawing C8585 in that connection W is not complete.

STAT

[ ] asks if there should be diodes in the W connection, otherwise, how is the subassembly cabled? Connection M shows special double microswitches. [ ] is confused by this and asks what the other microswitches shown are for. There seems to be considerable confusion

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in connection with the [ ] drawing. Further, the [ ] drawing shows a single microswitch mounted at the center position of the double cam movement. This switch is opened and closed each time the drive passes from one cam element to the other cam element.

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[ ] asks what this microswitch is for, as it has no apparent function, and may not be required by [ ]. Presumably [ ] will require three microswitches at each end of both sections of the dual cams. This would require a total of 12 microswitches for the variable diaphragm subassembly. [ ] asks if this is the correct number.

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24. Drawing E7470 (Ensemble Droit - Condenseur Cliche)  
Drawing C8593 (Condenseur Contr. Schem. Eclairage du Film)

On drawing C8593, there is a dotted line shown in the microswitch motor tachometer wiring. There is the same situation on drawing C8585. The wiring drawings do not show the third microswitch.

[ ] asks whether a third microswitch is required by [ ]

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25. [ ] does not have the cable wiring requirement for the eyepiece assembly. This is needed critically by [ ] should make the drawing and send it to them on an urgent basis.

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26. The [ ] drawings of the eyepiece filter wheel assembly do not show limit switches. [ ] asks if limit switches are required to be consistent with the philosophy of limit switches required elsewhere in the optical system.

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27. Condenser Assembly

In the case of the condenser assembly, there is a similar situation as in Drawing E7469. A new plug, not previously considered by

[ ] is required to connect with the harnessing for the microswitches.

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The arrangement is such that the harness end of the system will have a loose plug and the cable end of the system will be captive with an appropriate flanged receptacle. This new plug and receptacle assembly is an internal system with respect to [ ] and is required by the

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fact that [ ] is breaking their main optical assembly into removable subassemblies, and thus the electronic harness must be separable

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within itself to accommodate the subassembly arrangement. [ ] however, must select the appropriate plug and receptacle and send them to [ ] as soon as possible.

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[ ] has provided marked prints of their concept concerned with this item and Drawing E7469 (Ensemble Gauche, Condenseur Cliche). The marked prints are not accurate, and must be modified as just described.

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28. [ ] requires 12 3/8" diameter by 17 National coarse headless Allen set screws, 40mm long. In addition, two Allen wrenches to fit these screws are necessary. These screws should be sent to [ ] immediately by first class airmail addressed to [ ] with appropriate letter of transmittal. Stainless steel would be best, but if the delay is more than two weeks for stainless steel, cadmium plated may be sent.

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## 29. Cable Assemblies

In making the electronic assembly of the cables in the optical bridge, [ ] is to leave a 12" length extra for each cable, coiled up immediately behind the connection panel, back of the center section of the optical bridge. This is so the plug panel may be pulled from the back of the optical bridge for access to the individual cables and plugs.

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The cable requirement drawings previously sent to [ ] do not include the wire sizes and type specifications. The drawings should be revised to include these items, and small samples of the various wires should be sent so that they may be matched, as closely as possible, by [ ] from French wire suppliers.

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[ ] Schedule Review

STAT

The present [ ] schedule calls for completion of the acceptance testing by the end of November 1969. This is the date that has been shown for the past several months on the [ ] master program schedule. In reviewing the detailed schedule with [ ] monitor has concluded that the [ ] schedule may be optimistic and at this time a delay of approximately one month to the end of December 1969 should be anticipated. The primary reason for the delay is concerned with the manufacturing process.

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[ ] has had bad luck with some of the coatings for key lens assemblies such as the zoom systems. [ ] the coating subcontractor for [ ] has returned coated lenses to [ ] with many scratches on them requiring a stripping of the coating and a repolishing of the lens elements, together with re-coating. An additional difficulty has been caused by the use at [ ] of the FK 50 glass. This material has broken during grinding and polishing and has exhibited pitting under the coating, after the coating operation. In at least one instance, eight glass blanks were used up in making a single FK 50 element successfully.

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There have been delays in the delivery of [ ] glass. The final delivery of this glass is not expected to be until May 1969.

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These things have, of course, delayed [ ] very badly.

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[ ] is using a special cementing material for cementing certain of the lens elements. This material has been found difficult to work with and has resulted in improper cementing. This has required separation of the elements, cleaning and re-cementing, all contributing to the delays.

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It is worth pointing out at this time that [ ] has set a very high standard for themselves for the final optical performance of their system. They are rejecting work that does not come up to this very high standard, and this, undoubtedly, is one of the major contributing causes for the basic schedule slippage and delay.

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[ ] does not suggest that the standards set by [ ] are impossibly high. Rather, [ ] is exhibiting a healthy regard for the interests and desires of their customer to have the best possible optical system performance.

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#### Acceptance Testing

[ ] is attempting to work out with [ ] a system of acceptance testing whereby as many as possible of the testing parameters would be completed during subassembly and "on the bench". This means that the electrical/optical functions read out by the potentiometers would be determined as the program continues rather than left in abeyance until

STAT

final acceptance testing. This essential portion of the work can be performed without slowing up the final assembly of the optical system and without taking time after completion of the optical assembly during the final acceptance testing at [ ] In any event, [ ] will not compromise the final performance of the system by short-cutting any of the essential elements of acceptance testing.

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The pattern of requirements for the optical final acceptance testing has been developed at [ ] in outline form, and a variety of test target material was delivered to them. The list of targets is as follows:

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- a. Two items - anamorph test grid, 10X reduction.
- b. Two items - anamorph test grid, 20X reduction.
- c. Two circle targets - 50, 130, 280, 590 micrometer diameters, all circles, concentric.
- d. One anamorph test grid, very small pattern - not calibrated.
- e. Two rectangular test grids, various sizes.
- f. One resolution target on film for use at 200X magnification - Serial #5.
- g. Two resolution targets on film about 3/4" overall dimensions.
- h. Two circles as items above, but of reject quality for [ ] to use in their experimental activities.
- i. One cross-line target with one scale. The cross-line is at the center of the scale, and is at 90° to the scale.

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Some twelve pages of outline data were obtained from [ ] regarding performance of the acceptance tests.

STAT

The electronic test equipment available at [ ] was reviewed to see if there was anything which would be useful to [ ] during the testing period. [ ] could count on [ ] to provide a Tektronix oscilloscope, a portable volt ohm milliammeter, and a Hewlett-Packard volt meter, catalog no. 342B, D.C., differential volt meter/ratio meter, with six place digital readout.

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[ ] will have to bring all other equipment that is required.

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#### Packaging for Shipping

[ ] was directed to begin consideration of the techniques required for shipping the assembled optical system to [ ]

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It was suggested that the packaging system include the use of pneumatic pillows in one or two layers, with an appropriate barrier, depending on the sensitivity requirements of the final package.

The shipping containers are to be re-usable, since there will be a second shipping stage between [ ] and the final installation site. In addition, [ ] was asked to include recording accelerometer in their final package to show whether or not there was improper handling of the cases during shipment. [ ] will provide the accelerometers to [ ]

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[ ] was told to plan on air shipment, and it was suggested that they contact an airline such as TWA to determine what peak acceleration the packaging should be designed for. In addition, [ ] was asked to determine the maximum acceleration that they felt their optical system could stand as assembled and as properly blocked for shipment.

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It was noted that the optical bridge itself would probably have to be supported on a 3-point suspension during shipping to insure that there was no distortion of the castings during handling.

It is expected that there will be six substantial packages which may weigh a total of some three tons.

APP. II

## PROGRESS REPORT FOR PERIOD ENDING 31 MARCH 1969

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1.0 Progress During Reporting Period

Drawings were released on the test fixture and the [ ] preferred assembly and purchase orders were placed on these items.

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In response to the [ ] TWX, the painting of the front panel, chassis housing, and housing cover were changed.

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Outside vendor layouts of the integrator board were corrected for [ ] format.

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The Operating Manual, Maintenance Manual and Test Procedure rough drafts were prepared and forwarded to [ ]

STAT

Cable assembly drawings were changed to place markers on each end per [ ] request. The cables were modified accordingly.

STAT

Assembly work was completed on the time base generator, integrators, modulator, raster delay, video amplifiers and deflection amplifiers.

Check prints of the distortion analyzer assembly were received from an outside vendor and were determined to be satisfactory.

Overall progress to the end of this reporting period is approximately 70%.

2.0 Plans for Next Period

A rough draft of the recommended spare parts list will be prepared and forwarded.

The temporary meter panel will be designed as a shippable breadboard. Materials will be purchased so the panel can be ready for acceptance testing.

Assembly work will continue into the top assemblies and is expected to be near completion at the end of the next reporting period.

The remaining layouts by outside vendors should be completed in April. These boards will be the last items to be assembled. Documentation of the boards will then have to be integrated into [ ] format.

STAT

Sub assembly testing will be under way and near completion when top assemblies are able to accommodate them.

3.0 [ ] Visit

On 19 March, [ ] The monthly report, a memo regarding bulkhead connectors and letter regarding delayed submissions which were on route to [ ] were discussed.

The test slides with scale distortions were viewed on a light table and appeared to be generally satisfactory.

Drawings which were released during the previous period were scanned and questions which arose were answered. [ ] requested that the marking be changed on the cable assemblies.

The drawings were subsequently forwarded to [ ] A family tree drawing and an updated PERT chart were also forwarded.

Some completed subassemblies were examined. The illumination level in the [ ] equipment was discussed. [ ] does not intend to crowbar the light source or provide other measures to protect the image dissectors in their equipment in the event of high intensity illumination.

The content and format of the operating manual, maintenance manual and spare parts lists were discussed. The information to be included on the manuals was clarified so that the subsequent submissions would agree with the [ ] inputs from other sources.

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APP. III

Minutes of Meeting held with [ ] Personnel  
on April 3, 1969

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A meeting was held with [ ] representatives on  
April 3, 1969 to determine the progress which has been made toward the  
completion of the Programming effort, and to resolve scheduling problems  
relating to computer usage by [ ] personnel.

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[ ] reported that their program would be available  
for acceptance testing on May 12, 1969, and that there was a tape already  
available which could be used by [ ] for the servo simulation program  
(see Task 23).

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After some investigation, it was determined that a rearrange-  
ment of the existing servo simulation program was required in order to make  
it useful to [ ] for the simulation tests. [ ] agreed to do this, and  
to have the tape available on April 21.

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A second order of business was the conflict in computer  
utilization. [ ] agreed that they would use the computer after  
regular working hours in order to free it for use in servo simulation.

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Other items discussed during this meeting were the require-  
ments for filtering the program for the correlator, and the method of Earth  
Curvature data programming.

These items were deferred until a later date.

Job #342-Task 43 Computer Programming and Services

APP. IV

## MONTHLY PROGRESS REPORT

April, 1969

This technical report is for the reporting period from March 1 to March 31, 1969. The report is prepared according to

Specification number DB1001 (as modified).

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1. At the end of the month, coding on a great portion of the non-real time program was finished and approximately 75% checked out by  The routines included are:

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- a. DATAIN
- b. SCANNER
- c. CONVRT
- d. RECIN
- e. TTIN
- f. FID1
- g. PARMOD
- h. NOCAM and
- i. TBSRCH

Also at month's end, the background programs, (those under control of subroutine TRK), were fully integrated on the CDC 6600 computer. This means that we place a very high probability on the event of their trouble-free integration into the stereoscan programming system in the DDP 516 computer.

The only subroutine of the background program that was incomplete at the end of March was PTOP; therefore, a dummy was used for integration purposes.

At the end of the month, [ ] left [ ] and [ ] returned to the project to take his place. Since the manpower loading had already been reduced to one man, this meant no change in support for the [ ] project. However, since [ ] must extensively review [ ] work in order to finish the last 25% of check-out, progress has suffered somewhat. Approximately 60% of the total work has been completed as of this reporting period.

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Attached is a subroutine list in alphabetical order. Checks in the columns next to each subroutine indicate that it is coded, checked-out, or documented, respectively.

2. Next month, [ ] will review the non-real time coding in preparation for final check-out. Since the DDP-516 may not be available for part of the month, and high-speed peripheral will not be available for most of the month, the check-out itself may be deferred.

STAT

Those routines not now coded will be coded during April. These include:

- a. TTIC
- b. STAGIN

- c. FID2
- d. PRESET
- e. RDCR and
- f. RDCRX

3. At the end of March, the problem of how to filter the crosstalk out of the correlator had not yet been resolved. This has a low priority because it is not really clear that crosstalk will even be a problem.
4. Work on the earth-curvature addition to TMAT, the logic to avoid partial derivative blowups, and the "no camera data" alternatives are being deferred in lieu of a possible contract renegotiation.
5. There have been no oral agreements or understandings reached during the reporting period.
6. No changes or agreements have been made requiring the contracting officer's approval.
7. No other unresolved matters are known to exist.

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C = coded

✓ = code checked

D = documented